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ORIGINAL RESEARCH

Immigration, Health Care Access, and Recent Cancer Tests Among Mexican-Americans in California

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Abstract Immigrants' lower rates of cancer testing may be due to lack of fluency in English and other skills and knowledge about navigating US health care markets, lack of access to health services, or both. We analyzed 9,079 Mexican-American respondents to the 2001 California Health Interview Survey (CHIS) grouped as born in the US, living in the US 10 or more years, or living in the US less than 10 years. The CHIS provides the largest Mexican-American sample in a US survey. Access to care meant having health insurance coverage and a usual source of care. English proficiency meant the respondent took the interview in English. Multivariate logistic regression was used to predict outcomes. Respondents reporting more time in the US were more likely to report access to medical care and to report getting a cancer screening exam. Regardless of time in the US, respondents reporting access had similar test rates. Regression results indicate that time in the US and primary language were not significant relative to use of cancer screening tests, but access to care was. Cancer screening tests that are covered by Every Woman Counts, California's breast and cervical cancer early detection program, had smaller gaps among groups than colorectal cancer screening which is not covered by a program. California is the only state with a survey able to monitor changes in small population groups. Understanding barriers specific to subgroups is key to developing appropriate policy and interventions to increase use of cancer screening exams.

Keywords Mexican-American · Mammography · Pap · FOBT · Colorectal endoscopy · Access to care · Immigration · Language · Cancer testing · CHIS

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Introduction

It is not well-established why cancer screening rates are lower among Mexican-Americans in the US. Our study is the first to assess whether access to care, time in the US, and socioeconomic position explain these lower rates using data from the 2001 California Health Interview Survey (CHIS), the largest sample of Mexican-Americans available in any US survey.

Immigrants in the US have lower cancer screening test rates than other groups [1–3]; however the reasons are unclear. Foreign birth and language are barriers to cancer testing even after adjustment for other factors [4], possibly because lack of fluency in English limits knowledge about services and ability to navigate US health care markets [5–7]. Inadequate access to health services also explains lower rates of cancer testing among immigrants [8–10]. Previous studies have shown that Latinos, the largest immigrant group in the US, are less likely to obtain cancer testing than non-Latino whites [11–13]. But, in a prepaid health plan in San Francisco, California, Perez-Stable et al. [14] found no

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difference in cancer test use between Hispanic and non-Hispanic women even though 77% were born in Latin America and 80.8% responded to survey questions in Spanish. The foreign-born Latinos had been living in the United States for an average of 12.9 years and 30% were of Mexican background, 53% were Central American, and 14% were from other Latin American countries or Spain. This study suggests that equal access eradicates differences in cancer test use regardless of language or time in the US.

California has more Mexican-Americans than any other state, about 8.5 million in 2000. Latinos comprised about 32% of California's population in 2000, and three-quarters of Latino immigrants are from Mexico. Hunt et al. [15] have criticized research that presumes certain ethnic groups have particular cultural characteristics, fails to define what might constitute the host or ''mainstream'' society, or makes erroneous assumptions about the historical origins and movement of the populations under study, because these can result in an undertone of ethnic stereotyping. Ramirez et al. [16] recommend specifying the exact nationalities and regions of Hispanics. To address these concerns, we limit our analysis to the Mexican-American population in California. All respondents in our study have similar national origins even though they vary in their birth place and whether they speak English or Spanish. Thus we compare cancer testing among three Mexican-American groups: born in the US, immigrated at least 10 years ago, and in the US less than 10 years.

Of all major racial-ethnic groups in the US, Latinos are least likely to be insured [17], especially in California. A third of Latinos reported lacking insurance for all or part of the year, the highest rate of all racial/ethnic groups [18], so it is unclear whether findings for the general US population will hold for Mexican-Americans in California. For example, income, which could be used to purchase medical services, has been shown to be less important in the general US population than measures of access to health care (usually measured by health insurance and usual source of health care) for obtaining cancer screening services [19]. Because of lower rates of health insurance coverage, use of health services and cancer screening tests may depend more on income level among Latinos. As a result, income may be more important for obtaining cancer screening tests for Latinos than for population groups with higher rates of health insurance. If neither access to care nor income is associated with lower screening rates among Latinos, then do language or other cultural barriers explain them?

Our study addresses whether differential access to care for immigrants and non-immigrants is associated with different cancer test rates. We draw on the behavioral model of health services utilization as well as the extensive literature on cancer screening nationally and in various subgroups to investigate how health care access and time in the US shape use of cancer testing among Mexican-Americans living in California. The *behavioral model of health services utilization* is a useful conceptual framework for examining factors associated with use of health services, including cancer screening [20–22]. The model emphasizes a systems perspective that incorporates multiple dynamic influences that interact to impact the use of health services, including both individual-level and health system factors. For example, predisposing characteristics, such as patient age and education may influence the likelihood that an individual will get screened for cancer. Other factors, such as having health insurance coverage can enable access, while having a usual source of health care and a continuous relationship with a provider may reinforce screening recommendations. To the Andersen model, we explicitly add language, a predisposing characteristic, and time in the US, an enabling factor. Other authors have used these variables to understand cancer screening use among Asian immigrant groups [23, 24].

Our enhanced conceptual model combined with high-quality local statewide data can be used to design evidence-based policy and programs to increase cancer screening use among Mexican-Americans in California, especially as the state considers strategies to provide medical coverage to its uninsured population. California has some of the best health care access policies in the US, so problems found there are likely the tip of the iceberg nationally.

Ours is the first cancer screening study to compare immigrants and native-born from a single country of origin. This has the effect of controlling for differences that could arise from differences in nationalities and addresses the concern raised by Ramirez noted above. The large Mexican-American population in California and the large statewide sample provided by the CHIS allowed us to delimit our study sample to Mexican-Americans in California. While the literature on cancer screening in minority and immigrant populations is growing, small sample sizes have limited the ability of researchers to test for associations in carefully delimited populations such as our study does. The type of focused local analysis that we perform in this study has the potential to provide a powerful evidence base for policy and program purposes.

Methods

The CHIS is the largest state health survey in the country, and California has the largest population of Mexican-Americans in the nation. We use the CHIS 2001 data to examine cervical, breast, and two types of colorectal cancer test use among Mexican-Americans. Though social

structures pertinent to health care delivery include provider-related and other contextual factors [21] not measured by the CHIS, the self-reported items that are available in the CHIS can be usefully grouped into demographics, socioeconomic position, and access to health care. Below, we describe the study sample, define our outcomes of interest and the covariates considered for analysis, and explain our statistical approach.

It is noteworthy to indicate that we view Latino/Latina and Hispanic as having the same essential meaning; however, we favor Latino (masculine sex or both sexes) or Latina (feminine sex) since they are the preferred terms in California. When referring to publications, we use the terms employed by the authors. The focus of our study is on Mexican-Americans, a subgroup of the Latino/Latina or Hispanic population.

Data

We analyzed the 2001 CHIS which interviewed a representative sample of California's population in Spanish, English and four Asian languages. The 2001 CHIS randomly selected 55,428 California households for an Random Digit Dial (RDD) telephone survey. One randomly selected adult aged 18+ from each participating household was interviewed. The CHIS data were weighted to the 2001 California Department of Finance projections at the county and state levels [25]. Adult completion rates were 59% for the testing and 64% for the extended interview, resulting in a response rate of 38% (59 × 64%) for the extended interview [26]; this is comparable to the telephone-administered California Behavioral Risk Factor Surveillance System Survey [27]. The CHIS provides representative data for California's ethnically diverse population [28]. More detailed descriptions about data collection methods [29], sample design [30], and weighting [25, 31] are published elsewhere. The CHIS was approved by the University of California at Los Angeles Institutional Review Board and by the California State Committee for the Protection of Human Subjects, and received OMB clearance.

Our study sample includes 9,079 respondents aged 18 and older who reported Mexican origins and place of birth from the 2001 CHIS. Within immigrants, we distinguished between those in the US 10 years or longer because previous research showed that immigrants who have been in the US 10 years or more are not statistically different from the native born [32]. Of the Mexican-Americans living in California, 18% of women and men were recent immigrants, 47% of women and 49% of men were in the US 10 years or longer, and 36% of women and 34% of men were born in the US.

Spanish bilingual interviewers were trained according to protocol in sessions that included both English-only and bilingual interviewers. All bilingual interviewers practiced with the Spanish language instrument before proceeding to live interviewing in Spanish. The training was monitored by Spanish-speaking team leaders in each interview site [29].

Variables

Outcomes

Recent cancer test use was defined for four types of cancer testing according to recommendations for age and sex [33]. A mammogram was considered recent if conducted within the previous 2 years, and a Pap test was considered recent if conducted within the previous 3 years. Two different colorectal cancer tests were measured. In the regression analysis, respondents were considered to have had a recent colorectal exam if they reported a home stool blood test in the last year or a colorectal endoscopy within 5 years. The questions were as follows:

Mammogram:

- Have you EVER had a mammogram? [IF NEEDED, SAY: "A mammogram is an X-ray taken of each breast separately by a machine that flattens or squeezes each breast."

Pap smear:

- Have you ever had a Pap smear test to check for cervical cancer? [IF NEEDED, SAY: "A pap smear is a routine cancer test for women in which the doctor examines the cervix during a gynecological exam, and takes a cell sample from the cervix with a small stick or brush and sends it to the lab. This is not a test for detecting sexually transmitted diseases."]

Endoscopy:

- Have you ever had a sigmoidoscopy, colonoscopy, or a proctoscopy to look for signs of cancer or other problems in your colon? [IF NEEDED SAY: "A SIGMOIDOSCOPY is an exam in which a health care professional inserts a flexible tube into the rectum and the lower part of the colon to look for signs of cancer or other problems. A COLONOSCOPY is a SIMILAR exam but uses a longer tube to examine the entire colon. Before a colonoscopy is done, you are usually given medication through a needle in your arm to make you sleepy. A PROCTOSCOPY is an exam that uses a rigid tube."]

FOBT:

- The following questions are about the blood stool or occult blood test, a test to determine whether you have

blood in your stool or bowel movement. The blood stool test can be done at home using a kit. You smear a small amount of stool on cards at home and send the cards back to the doctor or lab. Have you ever done a blood stool test, using a HOME test kit?

Those who responded 'Yes' to any of the above questions were asked "*When was your most recent exam?*" The possible choices for the response were:

A year ago or less
More than 1 year ago up to 2 years ago
More than 2 years ago up to 3 years ago
More than 3 years ago up to 5 years ago
More than 5 years ago
"Refused"
"Don't know"

An additional category, more than 10 years ago was asked only for endoscopy (and the 5 years ago category was capped at up to 10 years ago). Respondents who reported "refused" or "don't know" were deleted from the analysis.

Independent Variables

Time spent in the US was based on place of birth and time in the US. Respondents were grouped by: (1) recent immigrants, (2) immigrants in the US 10 years or longer, and (3) born in the US.

Access to care was based on health insurance coverage and usual source of care. Access is defined as reporting both insurance and a usual source of care. The CHIS contains several questions designed to elicit type of health insurance coverage, including full and part-year coverage. If the respondent reported any coverage over the past year, they were counted as insured. To determine whether a respondent had a usual source of care, we used the questions, "Is there a place you usually go for Health care? (yes/no) and "What kind of place do you go to most often? (a doctor's office, a clinic or hospital clinic and some other place were counted as "yes; Emergency Room was counted as no).

We adjusted for covariates known to be predictive of cancer testing in the general population [34]. Though social perspectives of demographic factors can be changed, demographics themselves cannot. We therefore included demographic variables as controls and do not hypothesize about them. Age is continuous. Education was grouped into less than high school, high school, more than high school. Income was grouped relative to the federal poverty level as 0–99% FPL, 100–199% FPL, 200% + FPL. Having seen a medical doctor in the past 12 months, residence in a metropolitan statistical area (MSA), and family history of cancer were grouped as yes or no. Language of interview is English or Spanish.

Statistical Analysis

To consider associations in the Mexican-American population, we first examine the characteristics of Mexican-Americans in California stratified by sex and the amount of time they report having lived in the US; we then stratify the data by sex and by both time in the US and access to medical care in order to examine whether these subgroups are obtaining cancer screening tests at similar rates; finally we test for associations with covariates shown to be predictors of cancer exams in previous studies [16, 34]. Proportions are weighted to the population.

We used logistic regression adjusting for other covariates listed above to assess the relationship of the two major predictors to each cancer test—time spent in the US and access to care. From this regression model we computed adjusted percentages called predicted marginals [35]. Using the entire sample, we fit a logistic regression model to predict the odds of use of cancer screening tests controlling for other covariates. We then estimated the predicted marginals from this model by assuming that all subjects belong to one group (e.g., have access to care) and averaging over the entire group to obtain the probability of using a screening test for this group. (For more details refer to Korn and Graubard [35]).

Predicted marginals are interpreted like percentages but are adjusted for other covariates. If all observations belonged to one group (males), then their average predicted value for the outcome is the predicted marginal for that group (males). Predicted marginals (PM) are more intuitive than odds ratios and make it convenient to compare screening use between different sub-groups (for example, percentage of men using colorectal cancer screening versus percentage of women using colorectal cancer screening).

Analyses were restricted to age and sex groups for which cancer tests are recommended: women and men 50 and older for colorectal cancer screening; women 40 and older for mammogram; women 18 and older for Pap test. Analyses were adjusted for the complex survey design using SAS V8.2 [36] and SUDAAN V8.0 [37]. Significance tests are two-sided and P-values < 0.05 are considered significant.

Results

Characteristics of Mexican-Americans stratified by length of time lived in the US are shown in Tables 1 and 2. The youngest median age was among recently immigrated men and women. Men and women born in the US were most

Table 1 Characteristics of 3,778 Mexican-American Men in California by Time in the United States, 2001 CHIS

Characteristics	Born in the US (N^a = 1,527)			Lived in the US 10+ years (N = 1,771)			Lived in the US <10 years (N = 480)		
	N	%	95% CI[b]	N	%	95% CI	N	%	95% CI
Age N, Median	N = 1,527, 32 years			N = 1,771, 38 years			N = 480, 26 years		
Access to health care									
Insured and has usual source of care	1,114	69.6	65.9–73.0	991	53.7	51.2–56.1	141	28.5	23.5–34.2
Uninsured or no usual source of care	412	30.4	27.0–34.1	778	46.3	43.9–48.8	339	71.5	65.8–76.5
Seen medical doctor in the past year									
Yes	1,195	75.8	72.4–79.0	1,168	65.9	62.9–68.8	276	57.9	52.4–63.1
No	331	24.2	21.0–27.6	603	34.1	31.2–37.1	204	42.1	36.9–47.6
Education									
Less than high school degree	226	21.7	18.9–24.7	1,032	67.7	65.0–70.2	296	65.6	59.9–70.9
High school degree	595	36.7	33.3–40.3	406	18.7	17.0–20.5	106	21.6	17.3–26.6
More than high school degree	706	41.6	38.5–44.8	333	13.6	11.8–15.8	78	12.8	9.5–17.2
Ratio of family income to poverty level									
0–99% FPL	169	13.3	11.0–16.1	468	29.7	26.4–33.2	238	51.6	45.8–57.4
100–199% FPL	316	21.5	19.0–24.3	701	40.2	37.6–42.8	174	33.7	28.4–39.5
≥200% FPL	1,042	65.2	61.6–68.6	602	30.2	27.5–33.0	68	14.7	10.8–19.5
Rural/urban (OMB)									
Metropolitan	1,362	97.4	96.9–97.8	1,526	96.8	96.3–97.2	440	97.9	97.1–98.5
Non-metropolitan	165	2.6	2.2–3.1	245	3.2	2.8–3.7	40	2.1	1.5–2.9
Cancer in blood relative									
Yes	400	22.9	20.3–25.8	267	13.8	12.1–15.8	37	8.2	5.3–12.3
No	1,110	77.1	74.2–79.7	1,487	86.2	84.2–87.9	438	91.8	87.7–94.7
Language of interview									
English	1,480	96.5	95.1–97.5	478	24.1	21.7–26.6	34	7.0	4.7–10.4
Spanish	47	3.5	2.5–4.9	1,293	75.9	73.4–78.3	446	93.0	89.6–95.3

[a] N = Sample size

[b] Confidence interval

% & Confidence intervals are based on data weighted to the population

likely to report access to care (70% of men, 78% of women), followed by those who lived in the US at least 10 years (54% of men and 58% of women). Men and women in the US less than 10 years were least likely to report access (29%, 31%).

Fewer than 25% of men and women born in the US had less than high school education. The overwhelming majority of immigrants were less educated. There was a distinct gradient in the percentage of men and women living in poverty across the three groups. Among men, 13% born in the US, 30% who lived in the US 10 years or more, and 52% who lived in the US less than 10 years reported family income below the federal poverty level. Among women, 22% born in the US, 45% who lived in the US 10 or more years, and 60% who lived in the US less than 10 years reported family income below the federal poverty level. Even though women in all three groups were more likely than men to report living in poverty, they were more likely than men to report seeing a medical doctor in the past year. Moreover, rates for seeing a medical doctor declined with how recently respondents immigrated. For women, 89% born in the US, 83% who lived in the US 10 years or more, and 76% who lived in the US less than 10 years reported seeing a medical doctor in the past year. For men, 76% born in the US, 66% who lived in the US 10 years or more, and, 58% who lived in the US less than 10 years reported seeing a medical doctor in the past year.

Few Mexican-Americans lived in rural (non-metropolitan) areas in 2001. The longer in the US, the more likely they were to report a blood relative with cancer. Whereas nearly all men and women born in the US took the interview in English (97% and 96%), less than a quarter of long-term immigrants did (24% and 22%), and few recent immigrants did (7% and 4%).

Table 3 shows recent cancer test use by time in the US for the three groups, stratified by access to health services. Regardless of time in the US, respondents reporting access had similar test rates. Lower rates were reported by

Table 2 Characteristics of 5,301 Mexican-American women in California by time in the United States, 2001 CHIS

Characteristics	Born in the US (N^a = 2,287)			Lived in the US 10+ years (N = 2,261)			Lived in the US <10 years (N = 753)		
	N	%	95% CI[b]	N	%	95% CI	N	%	95% CI
Age N, Median	N = 2,287, 34 years			N = 2,261, 38 years			N = 753, 29 years		
Reported access to health care									
Insured and has usual source of care	1,867	78.2	75.3–80.9	1,413	58.2	55.3–61.0	266	31.4	27.4–35.7
Uninsured or no usual source of care	419	21.8	19.1–24.7	848	41.8	39.0–44.7	486	68.6	64.3–72.6
Seen medical doctor in the past year									
Yes	2,051	88.7	86.5–90.6	1,914	82.8	80.5–84.9	597	76.3	71.9–80.2
No	235	11.3	9.4–13.5	346	17.2	15.1–19.5	155	23.7	19.8–28.1
Education									
Less than high school degree	394	24.7	22.1–27.6	1,356	72.2	70.1–74.3	496	71.7	67.3–75.8
High school degree	809	34.1	31.7–36.6	475	15.2	13.5–17.1	151	16.9	13.3–21.2
More than high school degree	1,084	41.2	38.3–44.1	430	12.6	11.1–14.2	106	11.4	8.7–14.8
Ratio of family income to poverty level									
0–99% FPL	437	22.3	19.7–25.1	947	44.9	42.2–47.6	415	60.3	55.9–64.5
100–199% FPL	538	24.8	21.9–28.0	780	35.5	33.0–38.1	256	29.7	25.8–34.0
≥200% FPL	1,312	52.9	49.5–56.3	534	19.6	17.6–21.8	82	10.0	7.4–13.3
Rural/urban (OMB)									
Metropolitan	1,990	97.2	96.7–97.6	1,952	97.2	96.9–97.5	666	97.7	97.0–98.2
Non-metropolitan	297	2.8	2.4–3.3	309	2.8	2.5–3.1	87	2.3	1.8–3.0
Cancer in blood relative									
Yes	726	30.4	27.9–33.1	469	20.1	18.0–22.4	99	12.2	9.6–15.4
No	1,546	69.6	66.9–72.1	1,780	79.9	77.6–82.0	653	87.8	84.6–90.4
Language of interview									
English	2,205	95.6	94.0–96.8	641	22.2	20.5–24.1	30	3.6	2.2–5.8
Spanish	82	4.4	3.2–6.0	1,620	77.8	75.9–79.5	723	96.4	94.2–97.8

[a] N = Sample size

[b] Confidence interval

% & Confidence intervals are based on data weighted to the population

respondents without access except for FOBT where we had a small sample. Differences were largest for colorectal endoscopy followed by mammography and Pap testing.

Respondents reporting more time in the US were more likely to report access to medical care (Tables 1, 2) and to report getting a cancer screening exam (Table 3). To test whether time in the US was significantly associated with access, we regressed access on the same factors that we used to test for associations with cancer screening exams (data not shown). Significant associations would suggest that time spent in the US is a pathway to access to care. Results showed a gradient for years lived in the US with Mexican-American women born in the US most likely to have access to care (63%, 95% CI = 61–65%;) followed by those in the US 10 or more years (58%, 95% CI = 57–59%) and finally those in the US less than 10 years (47%, 95% CI = 45–49%).

Predicted marginals, corresponding odds ratios and their respective confidence intervals are shown in Tables 4 and 5. Access to care, having seen a doctor, and family history predicted a mammogram. Age, access, and having seen a doctor were predictive of a Pap test. Age, access to medical care, having seen a medical doctor in the past 12 months and poverty level were associated with colorectal cancer testing for men. Except for poverty level, the same variables were associated with colorectal cancer test use for women.

Discussion

The rate of mammography for Mexican-American women aged 40 and older in California was relatively high, 78% in 2001 [38]. However, we found biennial mammography was far higher for women with than without access. For Mexican-American women with access, 78% of those born in the US and 79% of recent immigrants reported mammogram in the previous 2 years. The lowest rates, 38%, were

Table 3 Recent cancer test use among Mexican-Americans in California by access to health care and time in the US, 2001 CHIS

Cancer test	Reported access to health care (insured and has usual source of care)									Reported access problems (uninsured or no usual source of care)								
	Born in the US			10+ years			<10 years			Born in the US			10+ years			<10 years		
	N[a]	%	95% CI[b]	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI
Mammogram in the past 2 years (women age 40 and older)	919	78.2	74.3–81.6	736	72.7	68.2–76.8	45	78.9	58.5–90.8	144	50.4	39.2–61.6	337	54.6	47.6–61.5	89	37.8	27.0–50.1
Pap test in the past 3 years (women age 18 and older)	1,857	88.0	85.7–90.1	1,402	90.6	88.4–92.5	265	89.7	82.2–94.3	411	67.7	60.0–74.5	840	81.7	78.2–84.8	483	80.9	76.3–84.8
Home FOBT in the past year (women age 50 and older)	525	21.1	16.8–26.1	383	8.0	5.0–12.5	17	0.0	NA	65	10.2	3.3–27.3	130	2.4	0.9–6.5	31	4.9	0.7–29.1
Home FOBT in the past year (men age 50 and older)	331	14.7	10.9–19.4	261	11.9	7.9–17.5	7	0.0	NA	48	5.2	1.3–18.2	115	7.1	3.8–13.0	12	15.1	1.5–68.3
Colorectal endoscopy in the past 5 years (women age 50 and older)	523	32.4	26.7–38.5	381	36.8	30.5–43.6	17	19.5	6.4–46.1	66	10.6	3.7–26.9	130	9.1	4.8–16.4	32	2.9	0.6–12.1
Colorectal endoscopy in the past 5 years (men age 50 and older)	331	48.1	41.6–54.7	263	47.5	40.2–55.0	5	13.1	1.2–64.9	48	16.1	6.9–33.3	115	14.9	9.5–22.6	12	2.2	0.4–11.5

[a] N = Sample size

[b] Confidence interval

% & Confidence intervals are based on data weighted to the population

Table 4 Adjusted correlates for cancer screening tests, Mexican-Americans in California, 2001 CHIS

Correlates	Mammogram					Pap test				
	Women					Women				
	OR	95% CI[a] OR	PM[b]	95% CI[a] PM	*P*-value[c]	OR	95% CI OR	PM	95% CI PM	*P*-value
Age (years)[d]	1.02	1.00–1.03			0.09	0.96	0.95–0.97			**0.00**
25	–	–	NA	NA		–	–	94.5	93.3–95.7	
40	–	–	64.2	59.9–68.5		–	–	90.2	89.0–91.5	
50	–	–	67.3	64.8–69.8		–	–	86.1	84.4–87.7	
65	–	–	71.7	66.3–77.0		–	–	77.4	73.8–81.0	
Access to health care					**0.00**					**0.00**
Insured and has usual source of care	1.97	1.41–2.75	72.5	69.0–75.9		1.82	1.29–2.56	91.2	89.7–92.7	
Uninsured or has no usual source of care	1.00	–	58.2	52.9–63.6		1.00	–	85.7	83.1–88.3	
Seen medical doctor in the past year					**0.00**					**0.00**
Yes	3.20	2.21–4.64	71.8	69.0–74.6		4.80	3.60–6.40	92.3	91.2–93.4	
No	1.00	–	45.8	37.9–53.8		1.00	–	73.2	68.8–77.5	
Poverty level					0.69					0.35
0–99% FPL	1.00	–	67.2	62.0–72.4		1.00	–	87.9	85.7–90.2	
100–199% FPL	1.01	0.70–1.46	67.4	63.1–71.7		1.24	0.88–1.74	89.8	87.9–91.7	
200% FPL and above	1.13	0.79–1.62	69.6	65.4–73.8		1.24	0.84–1.82	89.8	87.2–92.5	
Rural and urban (OMB)					0.58					0.35
Metropolitan	0.91	0.64–1.28	68.0	65.4–70.6		1.20	0.81–1.79	89.1	87.8–90.4	
Non-metropolitan	1.00	–	69.9	64.0–75.7		1.00	–	87.4	84.0–90.8	
Education					0.28					0.42
Less than high school degree	1.00	–	67.3	63.8–70.8		1.00	–	89.3	87.7–91.0	
High school degree	0.98	0.67–1.43	66.9	60.8–73.0		0.81	0.56–1.18	87.4	84.4–90.5	
More than high school degree	1.27	0.90–1.78	71.8	66.9–76.7		1.03	0.69–1.56	89.6	86.8–92.4	
Years lived in US					0.07					0.76
Born in US	1.00	–	72.1	67.1–77.1		1.00	–	89.8	87.0–92.7	
10+ years	0.77	0.52–1.14	67.1	63.3–70.8		0.87	0.56–1.34	88.6	86.7–90.4	
<10 years	0.50	0.27–0.90	57.7	46.5–68.9		0.92	0.51–1.69	89.2	85.7–92.6	
Cancer in blood relative					**0.02**					0.11
Yes	1.34	1.05–1.73	71.9	67.9–75.9		1.26	0.95–1.66	90.5	88.6–92.4	
No	1.00	–	66.3	63.2–69.3		1.00	–	88.6	87.1–90.0	
Language of interview					0.11					0.33
English	0.69	0.44–1.09	63.9	58.3–69.5		0.78	0.47–1.30	87.6	84.4–90.9	
Spanish	1.00	–	71.0	66.8–75.3		1.00	–	89.8	87.9–91.8	

[a] Confidence interval

[b] Predictive marginals are obtained from logistic regressions controlling for all the variables shown in the table [35]

[c] Based on Wald test [35]

[d] Predictive marginals can only be calculated at a particular value; since age is a continuous covariate, we computed the predictive marginals for specific ages

among recent immigrants who reported access problems. In Mexico, in 2000, less than 8% of women reported a mammogram in the previous year [39]. The median age of the Mexican-American women we studied ranged from 29 years for women who lived in the US less than 10–38 years for women who lived in the US for 10 or more years. The median age of women diagnosed with breast cancer is 62 years. Both incidence and mortality rates from breast cancer are lower for Hispanic whites than for non-Hispanic whites [40].

Differences between the groups were smallest for the Pap exam. Rates of Pap testing were relatively high for all groups, ranging from 68% for women born in the US with access problems to 91% for immigrants who lived in the US for 10 years or more and reported access. Several contextual factors may help explain these counterintuitive

Table 5 Adjusted correlates for cancer screening tests, Mexican-Americans in California, 2001 CHIS

Correlates	Colorectal cancer screening[a]									
	Women					Men				
	OR	95% CI[b] OR	PM[c]	95% CI PM	*P*-value[d]	OR	95% CI OR	PM	95% CI	*P*-value
Age (years)[e]	1.03	1.01–1.05			**0.01**	1.06	1.03–1.08			**0.00**
25	–	–	NA	NA		–	–	NA	NA	
40	–	–	NA	NA		–	–	NA	NA	
50	–	–	28.8	23.6–34.1		–	–	31.3	24.4–38.2	
65	–	–	36.3	32.0–40.7		–	–	48.0	43.1–53.0	
Access to health care					**0.00**					**0.00**
Insured and has usual source of care	4.07	2.23–7.40	39.4	35.0–43.7		2.42	1.42–4.12	47.4	41.8–52.9	
Uninsured or has no usual source of care	1.00	–	14.4	7.7–21.1		1.00	–	29.4	21.3–37.5	
Seen medical doctor in the past year					**0.00**					**0.00**
Yes	3.16	1.47–6.82	36.6	32.4–40.7		4.36	1.95–9.76	47.7	42.7–52.7	
No	1.00	–	16.4	7.1–25.8		1.00	–	19.7	9.2–30.2	
Poverty level					0.55					**0.03**
0–99% FPL	1.00	–	32.0	25.2–38.9		1.00	–	37.2	28.0–46.4	
100–199% FPL	1.23	0.80–1.89	36.2	29.4–43.1		1.13	0.62–2.04	39.6	31.6–47.5	
200% FPL and above	1.22	0.76–1.96	36.0	30.0–42.1		1.96	1.07–3.56	50.7	44.8–56.6	
Rural and urban (OMB)					0.65					0.05
Metropolitan	1.11	0.71–1.72	34.8	30.8–38.8		1.70	1.00–2.86	44.3	39.5–49.0	
Non-metropolitan	1.00	–	32.8	24.9–40.6		1.00	–	33.9	25.1–42.7	
Education					0.21					0.50
Less than high school degree	1.00	–	32.4	27.8–36.9		1.00	–	46.0	39.8–52.1	
High school degree	1.47	0.92–2.37	40.3	31.7–49.0		0.73	0.42–1.29	39.8	31.5–48.1	
More than high school degree	1.35	0.86–2.12	38.5	30.2–46.8		0.76	0.41–1.41	40.5	30.9–50.1	
Years lived in US					0.70					0.37
Born in US	1.00	–	35.4	28.4–42.4		1.00	–	40.3	31.4–49.2	
10+ years	0.98	0.61–1.57	34.9	29.4–40.3		1.42	0.73–2.77	47.3	40.5–54.0	
<10 years	0.56	0.13–2.29	24.3	3.4–45.2		0.46	0.03–6.32	26.1	0.0–62.0	
Cancer in blood relative					0.53					0.48
Yes	1.12	0.79–1.58	36.1	30.4–41.8		1.17	0.75–1.84	46.1	38.1–54.1	
No	1.00	–	33.9	29.1–38.7		1.00	–	42.9	37.8–48.0	
Language of interview					0.47					0.66
English	0.82	0.49	33.0	27.3–38.6		1.17	0.57–2.43	45.4	37.1–53.7	
Spanish	1.00	–	36.8	29.6–44.1		1.00	–	42.2	33.6–50.8	

[a] Includes Home FOBT in the past year and colorectal endoscopy in the past 5 years [33]

[b] Confidence interval

[c] Predictive marginals are obtained from logistic regressions controlling for all the variables shown in the table [35]

[d] Based on Wald test [35]

[e] Predictive marginals can only be calculated at a particular value; since age is a continuous covariate, we computed the predictive marginals for specific ages

findings. First, Pap test was the most widely used preventive service in Mexico in 2000: 55% of women 40 and older reported having one in the 12 months prior to their interview [39], though use of this test dropped to 30% in rural areas [41]. Among Mexican-American women respondents aged 40 and older in the CHIS 2001, 63% reported a Pap test in the previous year (data not shown); this was the same rate estimated for women in Mexico City [39]. Second, California's extensive program to provide breast and cervical cancer screening for low-income

women, *Every Woman Counts*, especially targeted Spanish-speaking women. This may help explain the generally high rates of Pap tests reported among Mexican-American women; and particularly why women without access are getting Pap testing at rates nearly as high as women with access. High rates of pap testing are clinically important because the cervical cancer incidence rate is twice as high among Latina Whites as non-Latina Whites [40].

Our study showed that Mexican-American men were more likely than women to use colorectal endoscopy. Another study among all racial-ethnic groups 50 and older using the CHIS found that men were more likely to report endoscopy [42]. That study also found that women were less likely than men to report a recommendation for the exam from their doctor. Findings of test use by sex in national surveys are inconsistent. Pollack analyzed 2002 BRFSS and found more non-Hispanic men than women reported CRC testing, but these results were not statistically significant. Nor was sex significant in the logistic regression, which included both Hispanics and non-Hispanics [43]. In Seeff's multivariate analysis of the 2000 NHIS [44], sex (not stratified by ethnicity) was significant. Men were more likely than women to report endoscopy or any CRC test, but women were more likely to report having an FOBT. Meissner et al. [45] examined the 2003 NHIS and stratified by sex. Prevalence of testing for sigmoidoscopy and any recommended test was higher for men than for women, but there were no significant differences by sex for test use among Hispanics. It may be that much smaller sample sizes for Hispanics in these national samples and low prevalence of test use is masking differences by sex. Our data specifically examine Mexican-Americans in California and cannot be generalized to all Hispanic or national populations. None of the national studies cited above examined physician recommendation.

We found that time in the US was significantly associated with access, suggesting that time spent in the US is a pathway to access to care. To our knowledge, our study is the first to show that access to care is directly associated with time living in the US. Crude rates showed that more time in the US also was associated with higher reported rates of family history of cancer. We suspect that higher rates of reporting reflect greater awareness of family history as a risk factor for breast cancer. It is unlikely that rates of cancer family history are actually higher among Mexican-Americans with more time in the US.

A comprehensive intervention to promote mammography in Washington [46] showed just how much test use can increase when cost barriers are eliminated. Eighty-seven percent of Latina migrant workers receiving vouchers obtained a mammogram within 30 days, compared with 17.5% of controls. These findings confirmed self-reports that cost was the major barrier to accessing mammograms and that use would increase when financial barriers were removed.

Understanding barriers specific to subgroups is key to developing appropriate policy and other interventions to increase use of cancer screening exams. Because the experience of immigrants from different countries is so varied, we limited our analysis to Mexican-Americans as suggested by Ramirez. Having access to medical care and having seen a medical doctor recently were predictors for all cancer tests. Neither time lived in the US nor language of interview predicted testing in the multivariate models. Though culture seems intuitively important, Abraido-Lanza et al. [11], using the 1991 NHIS, found that health services quality and access were more strongly associated than acculturation with cancer testing for Latinas in the US. Our study using the 2001 CHIS data confirmed that health services access was more strongly associated than time in the US for Mexican-Americans in California. Whereas Abraido-Lanza compared Latinas with non-Latina whites stratified by low or high acculturation [47, 48], we examined Mexican-Americans stratified by time reported in the US.

Other authors have shown how delivering health care in a more culturally competent way might help reduce health disparities [49] and how language-assistance programs could improve health care delivery [50]. In our study, nearly all Latino immigrants were interviewed in Spanish. We assume that respondents who interviewed in Spanish would also prefer to speak Spanish when obtaining medical services.

Earlier studies by Yoon, Bindman et al. located the Spanish language barrier within the context of financial barriers in California. In California, the large number of Spanish-speaking physicians seemed ample to serve the Latino population, but Spanish speakers were not getting health services at the same rate as other Californians. To investigate why, this research team surveyed physicians in 2001 and found that many Spanish-speaking physicians were unwilling to provide services to uninsured patients or those with MediCal coverage [51] because reimbursement rates did not cover the costs that physicians incurred for delivering their services [52]. These studies show that Spanish in-language services are available in California; however resources are needed to fully cover their costs either through adequate public and private insurance reimbursement or with screening-specific programs. In a study of Pap test use in California, Ponce found both Spanish and English-speaking Latinas were among the highest users [23].

The CHIS provides the largest sample of Mexican-Americans in a single state of any health survey in the United States. Nevertheless our study is limited in several ways. Survey responses are subject to self-reported error.

Validation studies have shown that respondents tend to telescope reported screening. To reduce the likelihood of this type of self-reported error occurring we used recent rates as our dependent variables. Cell sizes for recent immigrants are small, especially for recent immigrants aged 50 and older. The CHIS 2001 data is cross sectional which does not allow us to draw cause and effect conclusions. Finally, because CHIS data were collected in a single state, our study cannot be generalized to other states or the nation. Rather our findings await confirmation or refutation by subsequent researchers.

In conclusion, we found access to health care for Mexican-Americans strongly associated with cancer testing and, the longer they lived in the US, the more likely they were to report health care access and cancer tests. If respondents reported access to care, cancer test rates were similar regardless of time in the US. Cancer screening tests that are covered by *Every Woman Counts* had smaller gaps among groups with different amounts of time in the US and with access to medical care than colorectal cancer screening which is not covered by a similar program.

Two natural experiments would be captured by the CHIS data if proposed policy changes are implemented. One is if California were to extend its early detection program to include colorectal cancer screening; the other is if the governor and legislature extend health insurance universally. As the only state with a survey able to monitor changes in subpopulations, California would provide an opportunity to monitor the extent to which making health care coverage universal will deliver on the promise of equality in cancer prevention, early detection, and other medical services found in the prepaid health plan studied by Perez-Stable et al. [14].

References

1. Swan J, Breen N, Coates RJ, Rimer BK, Lee NC. Progress in cancer screening practices in the United States: results from the 2000 National Health Interview Survey. Cancer. 2003;97:1528–40. doi:10.1002/cncr.11208.
2. Coughlin SS, Uhler RJ, Bobo JK, Caplan L. Breast cancer screening practices among women in the United States, 2000. Cancer Causes Control. 2004;15:159–70. doi:10.1023/B:CACO.0000019496.30145.62.
3. Kagawa-Singer M, Pourat N. Asian American and Pacific Islander breast and cervical carcinoma screening rates and Healthy People 2000 objectives. Cancer. 2000;89:696–705. doi:10.1002/1097-0142(20000801)89:3<696::AID-CNCR27>3.0.CO;2-7.
4. Goel MS, Wee CC, McCarthy EP, Davis RB, Ngo-Metzger Q, Phillips RS. Racial and ethnic disparities in cancer screening: the importance of foreign birth as a barrier to care. J Gen Intern Med. 2003;18:1028–35. doi:10.1111/j.1525-1497.2003.20807.x.
5. Harmon MP, Castro FG, Coe K. Acculturation and cervical cancer: knowledge, beliefs, and behaviors of Hispanic women. Women Health. 1996;24:37–57. doi:10.1300/J013v24n03_03.
6. Fernandez LE, Morales A. Language and use of cancer screening services among border and non-border Hispanic Texas women. Ethn Health. 2007;12:245–63. doi:10.1080/13557850701235150.
7. Nguyen TU, Tanjasiri SP, Kagawa-Singer M, Tran JH, Foo MA. Community health navigators for breast- and cervical-cancer screening among Cambodian and Laotian women: intervention strategies and relationship-building processes. Health Promot Pract. 2008;9(4):356–67.
8. Zambrana RE, Breen N, Fox SA, Gutierrez-Mohamed ML. Use of cancer screening practices by Hispanic women: analyses by subgroup. Prev Med. 1999;29:466–77. doi:10.1006/pmed.1999.0566.
9. Carrasquillo O, Pati S. The role of health insurance on Pap smear and mammography utilization by immigrants living in the United States. Prev Med. 2004;39:943–50. doi:10.1016/j.ypmed.2004.03.033.
10. Suarez L, & Pulley L. Comparing acculturation scales and their relationship to cancer screening among older Mexican-American women. J Natl Cancer Inst Monogr. 1995;18:41–7.
11. Abraido-Lanza AF, Chao MT, Gammon MD. Breast and cervical cancer screening among Latinas and non-Latina whites. Am J Public Health. 2004;94:1393–8.
12. Perez-Stable EJ, Marin G, Marin BV. Behavioral risk factors: a comparison of Latinos and non-Latino whites in San Francisco. Am J Public Health. 1994;84:971–6.
13. Coughlin SS, Uhler RJ, Richards T, Wilson KM. Breast and cervical cancer screening practices among Hispanic and non-Hispanic women residing near the United States-Mexico border, 1999–2000. Fam Community Health. 2003;26:130–9.
14. Perez-Stable EJ, Otero-Sabogal R, Sabogal F, McPhee SJ, Hiatt RA. Self-reported use of cancer screening tests among Latinos and Anglos in a prepaid health plan. Arch Intern Med. 1994;154:1073–81. doi:10.1001/archinte.154.10.1073.
15. Hunt LM, Schneider S, Comer B. Should "acculturation" be a variable in health research? A critical review of research on US Hispanics. Soc Sci Med. 2004;59:973–86. doi:10.1016/j.socscimed.2003.12.009.
16. Ramirez AG, Talavera GA, Villarreal R, Suarez L, McAlister A, Trapido E, et al. Breast cancer screening in regional Hispanic populations. Health Educ Res. 2000;15:559–68. doi:10.1093/her/15.5.559.
17. Carrasquillo O, Himmelstein DU, Woolhandler S, Bor DH. Trends in health insurance coverage, 1989–1997. Int J Health Serv. 1999;29:467–83. doi:10.2190/1AV3-E901-TN3D-3H38.
18. Brown ER, Lavarreda SA, Ponce N, Yoon J, Cummings J, Rice T. The state of health insurance in California: findings from the 2005 California Health Interview Survey. Available at: http://www.healthpolicy.ucla.edu/pubs/publication.asp?pubID=226. Accessed on April 28, 2008.
19. Breen N, Wagener DK, Brown ML, Davis WW, Ballard-Barbash R. Progress in cancer screening over a decade: results of cancer screening from the 1987, 1992, and 1998 National Health Interview Surveys. J Natl Cancer Inst. 2001;93:1704–13. doi:10.1093/jnci/93.22.1704.
20. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? J Health Soc Behav. 1995;36:1–10. doi:10.2307/2137284.
21. Phillips KA, Morrison KR, Andersen R, Aday LA. Understanding the context of healthcare utilization: assessing environmental and provider-related variables in the behavioral model of utilization. Health Serv Res. 1998;33:571–96.
22. Coughlin SS, Breslau ES, Thompson T, Benard VB. Physician recommendation for Papanicolaou testing among U.S. women, 2000. Cancer Epidemiol Biomarkers Prev. 2005;14:1143–8. doi:10.1158/1055-9965.EPI-04-0559.
23. Ponce NA, Chawla N, Babey SH, Gatchell MS, Etzioni DA, Spencer BA, et al. Is there a language divide in Pap test use? Med Care. 2006;44:998–1004. doi:10.1097/01.mlr.0000233676.61237.ef.

24. Kagawa-Singer M, Pourat N, Breen N, Coughlin S, Abend MT, McNeel TS, et al. Breast and cervical cancer screening rates of subgroups of Asian American women in California. Med Care Res Rev. 2007;64:706–30. doi:10.1177/1077558707304638.
25. UCLA Center for Health Policy Research. California Health Interview Survey. CHIS 2001 methodology series: report 5-weighting and variance estimation. Los Angeles, CA: UCLA Center for Health Policy Research; 2002.
26. UCLA Center for Health Policy Research. California Health Interview Survey. CHIS 2001 methodology series: report 4-response rates. Los Angeles, CA: UCLA Center for Health Policy Research; 2002.
27. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System summary data quality report. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2001.
28. UCLA Center for Health Policy Research. The CHIS 2001 sample: response rate and representativeness. Technical paper No. 1. Available at: http://www.chis.ucla.edu/pdf/2001_response_representativeness.pdf. Accessed on April 28, 2008.
29. UCLA Center for Health Policy Research. California Health Interview Survey. CHIS 2001 methodology series: report 2-data collection methods. Los Angeles, CA: UCLA Center for Health Policy Research; 2002.
30. UCLA Center for Health Policy Research.California Health Interview Survey. CHIS 2001 methodology series: report 1-sample design. Los Angeles, CA: UCLA Center for Health Policy Research; 2002.
31. UCLA Center for Health Policy Research. California Health Interview Survey: technical report. CHIS 2001 Methodology Series: Revised CHIS 2001 Weights. Los Angeles, CA: UCLA Center for Health Policy Research; 2005.
32. LeClere FB, Jensen L, Biddlecom AE. Health care utilization, family context, and adaptation among immigrants to the United States. J Health Soc Behav. 1994;35:370–84. doi:10.2307/2137215.
33. Agency for Healthcare Research and Quality. U.S. Preventive Services Task Force. Available at: http://www.ahrq.gov/clinic/uspstfix.htm. Accessed on April 28, 2008.
34. Hiatt RA, Klabunde C, Breen N, Swan J, Ballard-Barbash R. Cancer screening practices from National Health Interview Surveys: past, present, and future. J Natl Cancer Inst. 2002;94:1837–46.
35. Korn EL, Graubard BI. Analysis of health surveys. New York: Wiley; 1999.
36. SAS Institute I. SAS/STAT user's guide, version 8. Cary, NC: SAS Institute, Inc; 1999.
37. Shah BV, Barnwell G, Bieler GS. SUDAAN user's manual, release 8.0. Research Triangle Park, NC: Research Triangle Institute; 1997.
38. Ponce NA, Babey SH, Etzioni DA, Spencer BA, Brown ER, Chawla N. Cancer screening in California: findings from the 2001 California Health Interview Survey. Los Angeles, CA: UCLA Center for Health Policy Research; 2003.
39. Valdespino JL, Olaiz G, López-Barajas MP, Mendoza L, Palma O, Velázquez O, et al. Encuesta Nacional de Salud 2000. Tomo I. Vivienda, población y utilización de servicios de salud. [housing, population and utilization of health services]. Cuernavaca, Morelos, México: Instituto Nacional de Salud Pública; 2003.
40. Ries LAG, Melbert D, Krapcho M, Stinchcomb DG, Howlader N, Horner MJ, et al. SEER Cancer Statistics Review, 1975–2005. Available at: http://seer.cancer.gov/csr/1975_2005/. Accessed on April 23, 2008.
41. Lazcano-Ponce EC, Moss S, Alonso de Ruiz R, Castro JS, Hernandez AM. Cervical cancer screening in developing countries: why is it ineffective? The case of Mexico. Arch Med Res. 1999;30:240–50. doi:10.1016/S0188-0128(99)00006-8.
42. Etzioni DA, Ponce NA, Babey SH, Spencer BA, Brown ER, Ko CY, et al. A population-based study of colorectal cancer test use: results from the 2001 California Health Interview Survey. Cancer. 2004;101:2523–32. doi:10.1002/cncr.20692.
43. Pollack LA, Blackman DK, Wilson KM, Seeff LC, Nadel MR. Colorectal cancer test use among Hispanic and non-Hispanic U.S. populations. Prev Chronic Dis. 2006;3:A50.
44. Seeff LC, Nadel MR, Klabunde CN, Thompson T, Shapiro JA, Vernon SW, et al. Patterns and predictors of colorectal cancer test use in the adult U.S. population. Cancer. 2004;100:2093–103. doi:10.1002/cncr.20276.
45. Meissner HI, Breen N, Klabunde CN, Vernon SW. Patterns of colorectal cancer screening uptake among men and women in the United States. Cancer Epidemiol Biomarkers Prev. 2006;15:389–94. doi:10.1158/1055-9965.EPI-05-0678.
46. Skaer TL, Robison LM, Sclar DA, Harding GH. Cancer-screening determinants among Hispanic women using migrant health clinics. J Health Care Poor Underserved. 1996;7:338–54.
47. Abraido-Lanza AF, Chao MT, Gates CY. Acculturation and cancer screening among Latinas: results from the National Health Interview Survey. Ann Behav Med. 2005;29:22–8. doi:10.1207/s15324796abm2901_4.
48. Abraido-Lanza AF, Chao MT, Florez KR. Do healthy behaviors decline with greater acculturation? Implications for the Latino mortality paradox. Soc Sci Med. 2005;61:1243–55. doi:10.1016/j.socscimed.2005.01.016.
49. Brach C, Fraser I. Reducing disparities through culturally competent health care: an analysis of the business case. Qual Manag Health Care. 2002;10:15–28.
50. Brach C, Fraser I, Paez K. Crossing the language chasm. Health Aff (Project Hope). 2005;24:424–34. doi:10.1377/hlthaff.24.2.424.
51. Yoon J, Grumbach K, Bindman AB. Access to Spanish-speaking physicians in California: supply, insurance, or both. J Am Board Fam Pract. 2004;17:165–72.
52. Bindman AB, Yoon J, Grumbach K. Trends in physician participation in Medicaid. The California experience. J Ambul Care Manage. 2003;26:334–43.